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AIRCRAFT CIRCULARS

NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS

No. 171

THE S.P.C.A. 30 M.4 MILITARY AIRPLANE (FRENCH)

A Multiplace Low-Wing Monoplane

Washington
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A Multiplace Low-Wing Monoplane

The S.P.C.A. 30 M.4 multiplace of the Société Provencale de Constructions Aéronautiques, was designed to carry four men and meet all the requirements of the 1928 program. (Figs. 1, 2, and 3.) As a fighter, it is intended for observation and for accompanying bombardment squadrons. Its equipment also enables it to serve as a day or night bomber. In all situations, its defense is assured with the maximum efficacy. The arrangement of its three firing stations leaves no field uncovered, the downward firing field being increased by the narrowness of the fuselages. Its all-metal construction enables it to endure all kinds of weather. Since it is composed of elements easily demountable and interchangeable, repairs can be readily made. This airplane can be converted into a three-engine ambulance airplane with a detachable cabin under the fuselage. (Fig. 4.)

The wing is of the cantilever type, made in three separately demountable parts, namely, a central portion of uniform section supporting the cabin, fuselages, engine bearers, and landing gear (fig. 5); and two lateral portions, each joined to the central portion by four bolts. The two wing spars are lattice girders of uniform height in the central portion, but tapering uniformly in the lateral portions. Each spar flange consists of two continuous semicylindrical duralumin plates and a U riveted together so as to form an almost circular cross section. (Figs. 6 and 7.) These flanges taper uniformly in the lateral wing portions so as to form elongated cones. The spar webs are formed by lattices of box cross section. The wing covering is supported directly by the ribs, which likewise take the form of lattice girders. The triangular bracing in the planes of the upper and lower spar flanges is rigid, the bracing members being extruded in the form of omega. The ailerons are hinged to auxiliary lattice spars.

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*From data furnished by the manufacturers and from L'Aéronautique, August, 1932, pp. 238-239.

The wing covering is entirely of metal, consisting of corrugated sheets 0.35 mm (0.014 in.) thick reinforced internally by section metal. Some of the covering panels are attached by screws permitting their quick removal and easy inspection of the interior of the wing and of the supports of the controls.

The two fuselages are attached to the central portion of the wing by four bolts each. The framework of each fuselage consists of two triangularly braced girders joined at intervals by transverse frames. (Fig. 8.) The covering is smooth sheet metal 0.5 mm (0.02 in.) thick. The floor and ceiling are reinforced by stringers throughout their whole length. Each fuselage carries a ring machine-gun mount T.O.7. A central corrider connects the machine-gun station with the engine compartment and with the central cabin.

The central cabin is prolonged by a balcony projecting about 13 feet in front of the wing and has a structure similar to that of the fuselages. It has a continuous floor interrupted by a trapdoor for access and the requisite openings for navigation and for the operations of the observer. The cabin is divided lengthwise into two compartments by a partition with a connecting door. The forward compartment is for the chief observer and contains all the requisite instruments for navigation, observation, and bombardment, together with a ring machine-gun mount. The after compartment contains the two tandum pilot stations with dual control supported by two raised girders. Each station can be disconnected by the pilot of the other station. The flight controls are rigid and are mounted on ball bearings. The frame for supporting the bomb rack is in the bottom of the after compartment between the spars of the central part of the wing. This frame can also serve as a camera support in photographic missions.

The horizontal stabilizer has the same structure as the wing. It connects the two fuselages, with an overhang at each end. The elevator is mounted on ball bearings. The vertical empennage comprises a fin and a rudder at the tail of each fuselage. The structure is the same as that of the horizontal empennage.

The landing gear is composed of two independent symmetrical parts, each having a special steel axle, a tube of variable thickness attached by a ball-and-socket joint to the lower flange of the front spar of the central part

of the wing under the side of the cabin. An oblique fore-and-aft steel strut is attached to the lower flange of the rear wing spar under the center of each fuselage. A vertical strut provided with a Messier oleopneumatic shock absorber is attached to the lower flange of the front spar under the center of the engine bearer. The lower ends of these three members are joined so as to form a trihedral. At the apex of this trihedral and constituting the end of the axle, there is a spindle which carries a wheel 1,300 by 275 mm (51.2 by 10.8 in.). Each fuselage carries a swivelling tail skid provided with a Messier oleopneumatic shock absorber.

The S.P.C.A. 30 M.4 is equipped with two 650 hp Lorraine 18 Kd engines, mounted as shown in Figure 9, or two 650 hp Hispano-Suiza 12 Nbr engines. Two protected drop fuel tanks of L2R alloy are located in the central part of the wing, one on each side of the cabin. The fuel system makes it possible to supply each engine from either or both tanks.

The Lorraine engines have radiators of the frontal honeycomb type, while the Hispano-Suiza engines have retractable plate-type radiators located in the leading edge of the wing.

CHARACTERISTICS

Span	(about) 26.50 m	86.94 ft.	
Maximum chord of wing	4.91 "	16.11 "	
Chord at tip of wing	3.30 "	10.83 "	
Length	(about) 17.00 "	55.77 "	
Height	4.10 "	13.45 "	
Track	5.85 "	19.19 "	
Wing area	100 m^2	1076.39	sq.ft.

Engines:
Two 650 to 720 hp Lorraine Kd, or
Two 650 to 725 hp Hispano-Suiza 12 Nbr

Total weight	6,500 kg	14,330 lb.
Wing loading	65 kg/m²	13.31 lb./sq.ft.
Power loading	5 kg/hp	10.87 lb./hp

PERFORMANCE

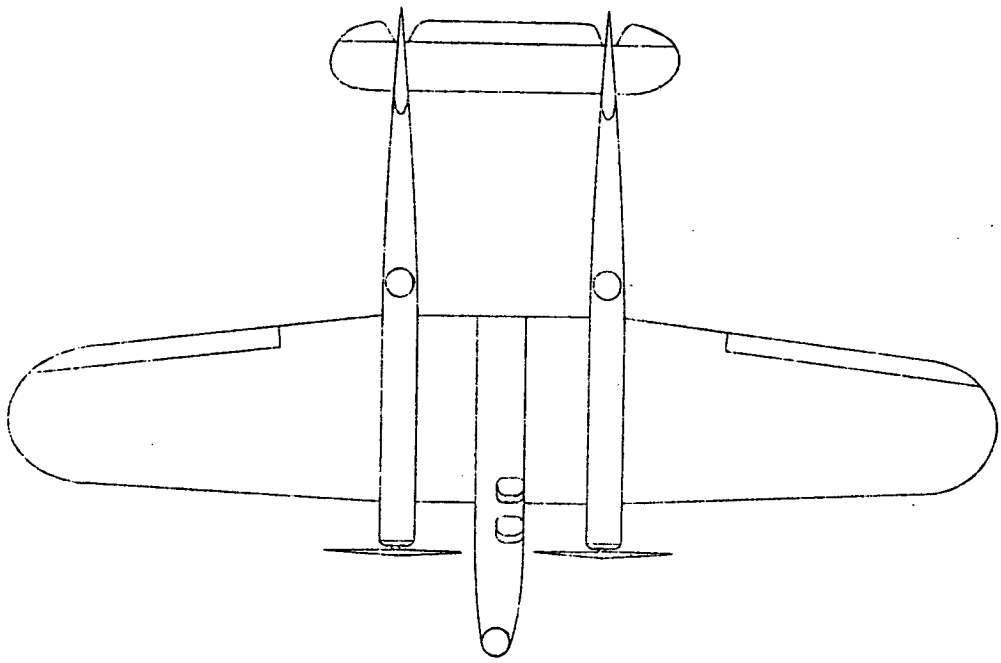
Maximum speed at sea level	255 km/h	158.4 mi./hr.
Landing speed	90 "	55.9 "
Ceiling	7,500 m	24,600 ft.

Climb to 2,000 m (6,560 ft.) in 6 min.

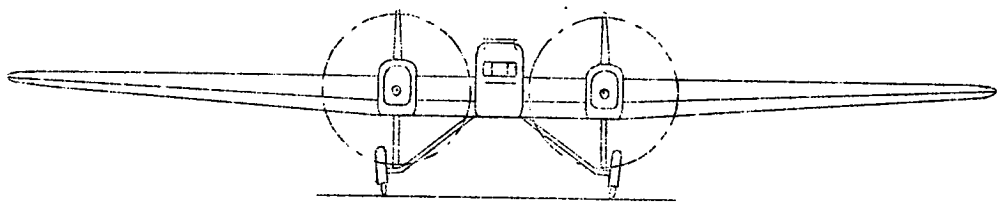
Climb to 5,000 " (16,400 ") " 20 " 30 sec.

Translation by Dwight M. Miner,
National Advisory Committee
for Aeronautics.

Fig. 1



Span 26.50 m (86.94 ft.)
Length 17.00 " (55.77 ")
Height 4.10 " (13.45 ")



Wing area 100 m^2 (1076.39 sq.ft.)
Two 650 hp engines.

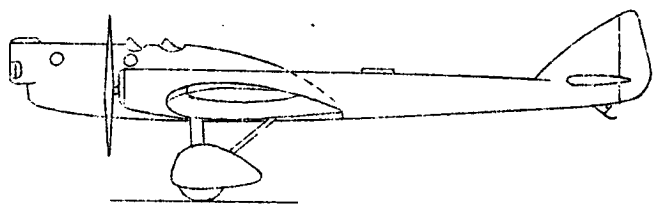
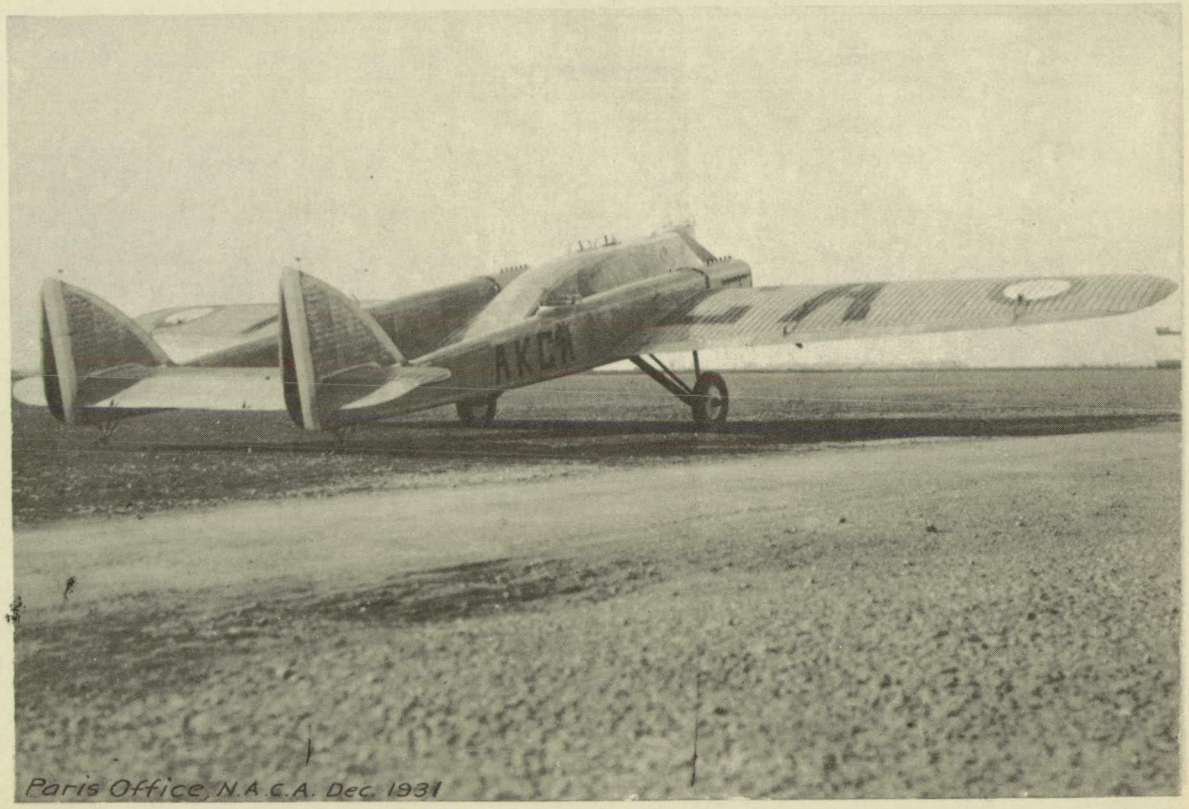
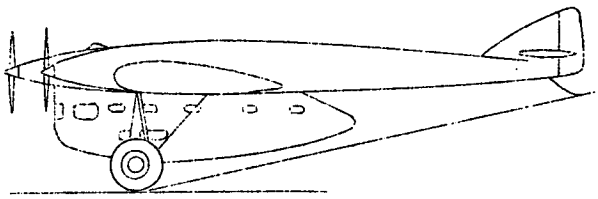


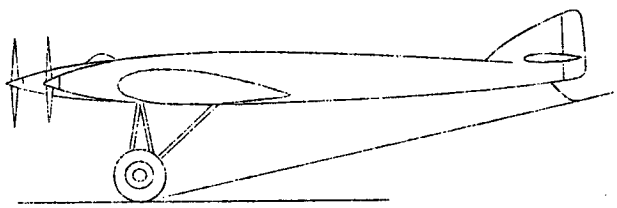
Fig. 1 General arrangement drawings of the S.P.C.A. 30 M4 airplane



S.P.C.A. 30 M4 multiplace fighter with two 650 hp Lorraine 18 Kd engines



Airplane with cabin

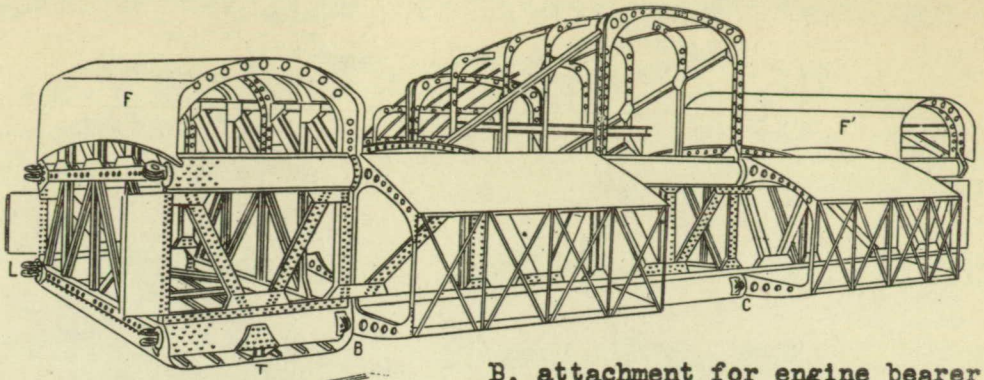


Airplane without cabin

Cabin removed for transportation
by tractor

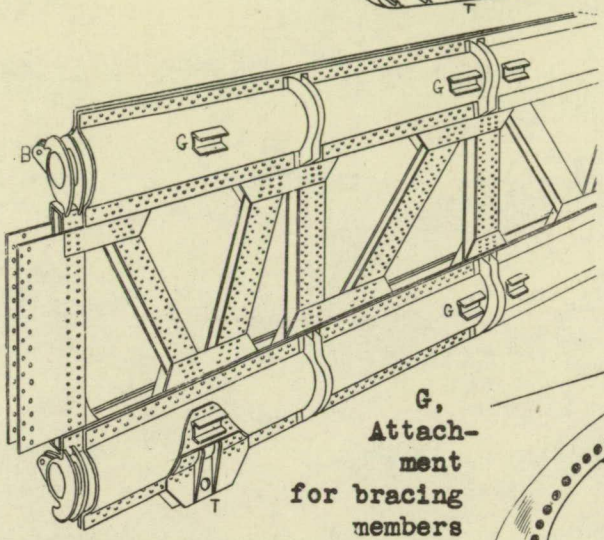
Fig. 4 Conversion of 30 M4 for use as an ambulance airplane

F and F', forward ends of fuselages



B, attachment for engine bearer
C, " " cabin
L, " " wing
T, " " landing gear

Fig. 5 Central portion of wing, seen from the front, with leading edge removed



G, Attachment for bracing members

Fig. 6 Spar of central part of wing, seen from within

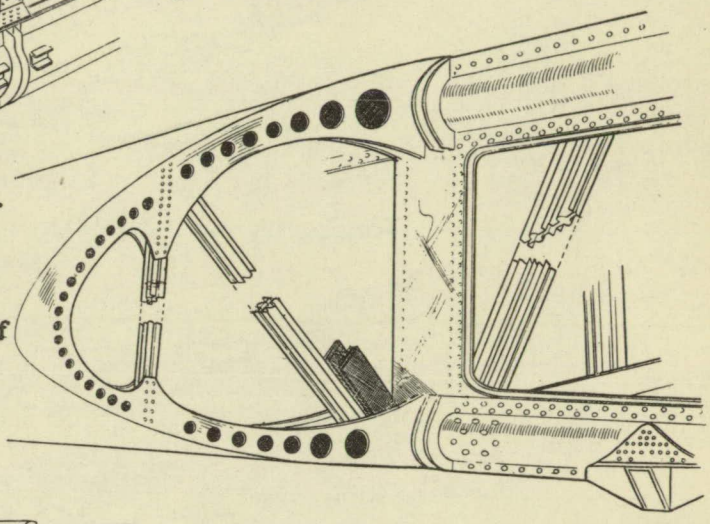


Fig. 7 Wing and rib structure.

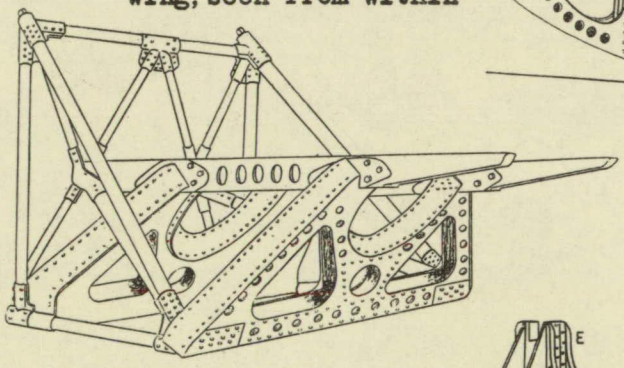
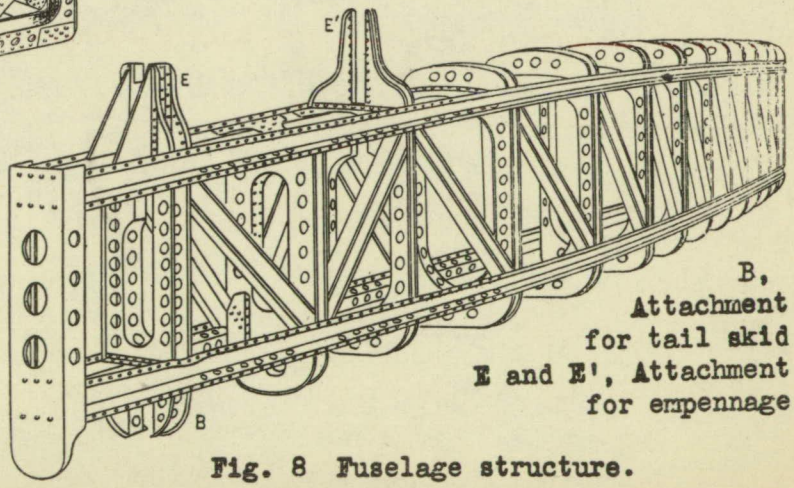


Fig. 9 Bearer for 650 hp Lorraine 18 Kd engine. Attached to central part of wing by four bolts.



B, Attachment for tail skid
E and E', Attachment for empennage

Fig. 8 Fuselage structure.